

Appl. No.: 10/777,608
Amdt. Dated December 13, 2005
Response to Office Action Dated October 3, 2005

Amendments to the Specification

Please replace paragraphs [0011], [0012], [0036], and [0040] with the following amended paragraphs:

[0011] The metal CMP process may be used in a damascene sequence where micro-scratches or small trenches may be unintentionally formed across the metal pattern of an IC. By exposing the residue-filled micro-scratch to plasma suitable to remove the metal material, the residue will react with the plasma to create a volatile gas that may ~~results~~ result in the residue vacating the micro-scratch. The residue in the micro-scratch thereby may be reduced to an acceptable level, substantially eliminated or removed altogether.

[0012] A carbon-fluoride (CF₄) plasma or other etching ~~flow~~ fluorine gas combinations such as NF₃, CHF₃, and C₄F₆ may be used for tungsten or copper materials used metal CMP process. Bromine and Chlorine chemistries also may be selected according to the type of metal used in the IC.

[0036] The metal ~~residue~~ in the scratch 314 is dry-cleaned to remove the residue. The dry-cleaning eradicates the residue in the scratch, and thereby ~~leave~~ leaves only an empty trench. By eradicating the residue, a short that is created by the presence of the conductive material in the scratch 314 is substantially eliminated. In addition, other failures such as an early life failure may be mitigated by dry-cleaning the residue from the scratch 314.

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[0040] The CF₄ plasma 430 may be diluted with an inert gas such as N₂ at a ratio of 1 to 1 and may be applied to the surface 320 at a pressure in the range of 0.3 Torr with a gas flow rate of 100 sccm. The temperature of the surface 320 may be in the range from room temperature to 250 °C. The surface 320 may be exposed to the CF₄ plasma 430 for a time sufficient to evacuate the residue from the scratch 314, based on the reaction rate CF₄ plasma 430 with the residue. In an embodiment, the surface 320 is exposed for approximately 10 seconds or less. Alternate plasmas may be used based on the type of residue to be evacuated. For example, CF₄ also may be used for copper or Br/Cl chemistries may be used for copper. Other ~~Fluor~~ Flourine containing gases also may be used such as CHF₃ and C₄F₈.